

Serial No. 10/627,894

Docket No. - AXD 0001 I3/31126.3 (01-SM5-218 C)

Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the present application:

1. (Currently Amended) A process for making a fluorine-free plasma cured material comprising:

providing [[a]] an uncured Si-containing porous dielectric material having a first dielectric constant, having a first elastic modulus, and having a first material hardness;

exposing the uncured Si-containing porous dielectric material to a fluorine-free plasma gas; and

plasma curing the uncured Si-containing porous dielectric material with [[a]]the fluorine-free plasma gas to produce a plasma cured porous dielectric material having a second dielectric constant which is less than or about equal to the first dielectric constant, having a second elastic modulus which is greater than the first elastic modulus, and having a second material hardness which is greater than the first material hardness, wherein the fluorine-free plasma gas comprises a combination of CH₄ plasma gas and N₂ plasma gas.

2. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is selected from an organic dielectric material, an inorganic dielectric material, or a combination thereof.

3. (Currently Amended) The process of claim 1 wherein the ~~organic~~ uncured Si-containing porous dielectric material is selected from a hydrogen silsesquioxane dielectric material, a methylsilsesquioxane dielectric material, or a combination thereof.

4. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is produced by

depositing a dielectric coating on a substrate using a spin-on process or a chemical vapor deposition process, and

forming pores in the coating.

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5. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is selected from a porogen-generated porous dielectric material, a solvent-formed porous dielectric material, a molecular engineered porous dielectric material, or a combination thereof.
6. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is plasma cured at a temperature less than or about 450°C.
7. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is plasma cured at a temperature between about 250°C and about 450°C.
8. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is plasma cured at a process pressure between about 1.0 Torr and about 5.0 Torr.
9. (Currently Amended) The process of claim 1 wherein the uncured Si-containing porous dielectric material is plasma cured for a time less than or about 180 seconds.
10. (Original) The process of claim 1 wherein the fluorine-free plasma gas further comprises H₂ plasma gas.
11. (Original) The process of claim 1 wherein the fluorine-free plasma gas further comprises a noble gas.
12. (Original) The process of claim 11 wherein the noble gas is selected from He, Ar, Ne, or combinations thereof.
13. (Original) The process of claim 1 wherein the fluorine-free plasma gas defines a gas ratio of CH₄ to N₂, and wherein the gas ratio is about 0.01 to about 0.05.

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14. (Currently Amended) The process of claim 1 wherein the increase in elastic modulus between the first elastic modulus of the uncured Si-containing porous dielectric material and the second elastic modulus of the plasma cured porous dielectric material is greater than or about 50%.
15. (Currently Amended) The process of claim 1 wherein the increase in elastic modulus between the first elastic modulus of the uncured Si-containing porous dielectric material and the second elastic modulus of the plasma cured porous dielectric material is greater than or about 100%.
16. (Previously presented) The process of claim 1 wherein the second elastic modulus of the plasma cured porous dielectric material is greater than or about 3 GPa.
17. (Previously presented) The process of claim 1 wherein the second elastic modulus of the plasma cured porous dielectric material is between about 3 GPa and about 10 GPa.
18. (Currently Amended) The process of claim 1 wherein the increase in material hardness between the first material hardness of the uncured Si-containing porous dielectric material and the second material hardness of the plasma cured porous dielectric material is greater than or about 50%.
19. (Previously presented) The process of claim 1 wherein the second material hardness of the plasma cured porous dielectric material is greater than or about 0.3 GPa.
20. (Previously presented) The process of claim 1 wherein the second material hardness of the plasma cured porous dielectric material is between about 0.5 GPa and about 1.0 GPa.

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21. (Previously presented) The process of claim 1 wherein a level of outgassing of the plasma cured porous dielectric material is significantly reduced or eliminated as compared to a thermal cured Si-containing porous dielectric material.

22-26. (Canceled)

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